ON RUPTURE OF INTESTINE.

WITH REPORT OF A CASE IN WHICH RUPTURE OCCURRED FROM MUSCULAR ACTION, AND RECOVERY FOLLOWED OPERATION.

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RECOVERY following operation for peritonitis resulting from the escape of matter from the digestive tract is daily becoming more frequent. As in perforation resulting from typhoid or tubercular ulceration, so in cases of traumatic rupture are our statistics becoming more and more encouraging.

In 1887, Curtis, in an exhaustive essay on this subject, including experiments on anæsthetized dogs and on the cadaver, was able to show that such rupture occurred in the vast majority of cases through crushing the bowels against the vertebral column. Curtis also analyzed 116 cases pathologically, but was able to report no cases of successful laparotomy and repair or recovery. In 1888, Mr. Croft, before the Clinical Society of London, reported a case where he had been able to prolong life for one month through making an artificial anus at point of rupture. This patient eventually died of exhaustion, being unable to stand the shock of the operation undertaken to close the opening. In 1890, however, the same surgeon was able to report the first case of recovery, and collected fourteen cases of operation undertaken with this object. From this time the cases of recovery came even more frequently, and by 1894, Mr. Battle, of St. Thomas's, was able to collect 15 further cases of operation with 9 recoveries. Since then, up to the end of 1904, I have been able to collect 12 recoveries from English and American literature, while the French yields 11 (out of 26 operations) and the German 9 (out of 32 operations),Gage, in 1902, was able to collect 85 cases of rupture of bowel occurring since 1887, or since the previous large collection by Curtis. In 40 of these operations

TABLE OF CASES OF RUPTURED INTESTINES OR MESENTERY TREATED IN THE WARDS OF THE MONTREAL GENERAL HOSPITAL DURING THE PERIOD 1895–1905.

ALL CASES WERE MALES.

Date.	Age.	Cause.	External Symptoms.	Main Symptoms.	Operation.	Post Trauma.	Lesions Present.	Result.	Cause of Death.
1898.	30	Collision on bicycle.	Bruise and hæmatoma.	Temperature 97° F.; pulse 104. Shock. Constitutional signs of hæmorrhage; vomiting; dulness in flanks.	Laparotomy and suture.	3 hours.	Ruptured small bowel, mesentery, superior mesenteric artery.	Death 5 hours; post trauma.	Hæmorrhage.
1899.	36	Kick from a horse.	Slight excoriation.	Temperature 96° F.; pulse, 72 (rapidly rising); unconscious; pain and tenderness. Rigidity of recti; tympany with dulness in flanks; vomiting.	Laparotomy and suture.	20 hours.	Ruptured small bowel and omentum.	Died 30 hours; post trauma.	Peritonitis.
1899.	48	Kick from a man; was admitted 36 hours post trauma, and would not consent to immediate operation.	None.	Temperature 99½° F.; pulse 100 36 hours post trauma; signs of general peritonitis.	Laparatomy and suture.	40 hours.	Ruptured ileum.	Died 84 hours; post trauma.	Peritonitis.
1902.	32	Fell 40 feet on back and side.	None.	Pain.	None.	.....	Ruptured mesentery.	Died 9 hours; post trauma.	Hæmorrhage.
1903.	50	Struck with knotted rope.	Bruise.	Temperature 96° F.; pulse uncountable; shock; pain.	None.	.....	Ruptured stomach, jejunum, liver.	Died 1 hour; post trauma.	Hæmorrhage and shock.
1904.	20	Kick by horse.	.....	Temperature 100½° F.; pulse 90; unconscious; vomiting; dulness in flanks.	Laparotomy and suture.	36 hours.	Ruptured jejunum.	Died 60 hours; post trauma.	Peritonitis.
1904.	56	Fall with timbers and machinery.	.....	Temperature 98° F.; pulse 90. 18 hours post trauma; pain.	None.	.....	Ruptured intestine (complete), mesentery; urethra; fractured femora.	Died 24 hours.	Hæmorrhage.
1905.	48	Lifting heavy weight.	None.	Temperature 96° F.; pulse 84 (rising); pain; rigidity.	Laparotomy and suture.	6 hours.	Ruptured ileum, mesentery.	Recovery.	.....

had been performed and in 17 recovery took place. Such figures are, however, at best misleading. Few report their unsuccessful cases, and many are diagnosed only postmortem, so that the percentage of recoveries falls much lower when compared with the post-mortem records of the various clinics whence they are reported.

In an analysis of 2443 autopsies which have been performed at the Montreal General Hospital since 1883, a period of twenty-two years, rupture of one or more abdominal viscera had taken place in 53; 63 organs being injured, spleen, 18 times; liver, 15; small bowel, 10; bladder, 12; left kidney, 5; right kidney, 2 pancreas, 1. Up to the present time 10 cases of ruptured small bowel have occurred, and all have proved fatal with present exception. This would give us a percentage of 9.09 per cent. recovery, which, though likely also to prove incorrect, must be nearer the mark than the 42 per cent. quoted by Gage, and which corresponds closely with Riegner's figures from the Allerheiligen Hospital zu Breslau where, out of 12 cases, 1 recovered from operation. (Cases dated from 1893.)

Strangely enough, eight of our cases have occurred within the last ten years, or in 13,060 surgical admissions figures which are more nearly correct for centres where a large emergency service is to be found. In five of these operation was performed with recovery or 12½ per cent. (see Table).

The following case is of interest both on account of his recovery, and more especially on account of the manner in which the lesion took place. I wish here to express my thanks to Dr. J. Alex. Hutchison, of this hospital, in whose wards the case occurred, and through whose courtesy I was enabled to carry out operation and treatment.

L. M., aged forty-eight years, an Arab, had always been well, but several weeks previous to admission had thought he might be "ruptured." Had in consequence visited a drugstore and bought a truss, which he has since worn. He never noticed a swelling in this region, and had no confirmation of his idea save that of the drug clerk and the fact that at times he felt uncom-

fortable in the inguinal region. Shortly after a moderate meal on April 19, 1905, he returned to work baling cotton. His companions being otherwise engaged, he attempted to lift a bale, weighing some 200 odd pounds, by himself. As he strained to lift, he had a sudden severe pain in abdomen, and was obliged to lie down at once, crying out on account of pain. The pain continued, and after a few minutes he was conveyed to the hospital in an ambulance. The ambulance surgeon thought a swelling in the right groin was present, but could not confirm it, but on arrival at hospital no hernia was present. At this time, three-quarters hour post trauma, the temperature was $96^2/_5°$ F.; pulse, 84. Patient was perfectly quiet and rational, but excited and anxious on account of the pain, which continued severe.

On examination nothing positive was discovered save a tenseness of the recti abdominis. He was kept under observation for four hours, during which period his temperature rose to 103° F. and his pulse to 104. The pain, now accompanied by slight tenderness, continued, as did the muscle spasm; indefinite dulness in right flank. The patient vomited once. On these signs, a diagnosis of "peritonitis" was made, "probably due to a rupture of the bowel."

The patient was prepared, and under ether anæsthesia the abdomen was opened below the umbilicus in the median line. A peritonitis most marked in the right lower quadrant of the abdomen was present. On exploring the internal ring of the right inguinal canal this was found enlarged, and a sac present, but no contents. The bowel in this neighborhood was first examined, and here a rupture in the long axis of the gut, large enough to admit a lead-pencil, with everted mucosa, was found. In the mesentery underlying this loop was a transverse tear two and one-half inches long. The contents of the bowel had escaped and were escaping; a moderate quantity of blood-clot was present; though all active hæmorrhage had nearly ceased. No sign of strangulation, bruising, or injury other than the above tears could be discovered. The rupture was closed with two purse-string followed by a layer of straight Lembert sutures, the abdomen flushed out with large quantities of warm saline solution, and closed without drainage. The patient made a recovery interrupted only by a slight superficial infection. The rupture was determined to be about the centre of the ileum.

Recovery was due, I feel, to early operation, and to the fact that it was not necessary to make a prolonged search for the rupture. The fact that a second rupture was not present was evidenced by the peritonitis being confined to the half-dozen loops of bowel in the neighborhood of the lesion found. Cultures taken at operation, although from escaped intestinal contents, showed, for some unknown reason, no growth.

Von Mikulicz and Kausch refer to rupture of the bowel through much strain—"sehr heftige Anspannung der Bauchmuskeln," and Mr. Thomas, in the *British Medical Journal*, 1894, reports a case occurring apparently from simply lifting a chair; but so far as I have been enabled to learn, these cases are rarely diagnosed ante-mortem, and no reported case so occurring has recovered. Bunge, of Königsberg, at the last Surgical Congress in Berlin, April, 1904, called attention to this variety, and reports a case not dissimilar to the above, as well as one resulting from a fall on a flat, smooth surface, the injuring force being thus similar in both. He has brought forward for the first time the importance of a hernia being present in these cases, and one can readily conceive that, when contents are present in a hernial sac the free movements of the bowels may be interfered with, allowing a less active force an opportunity for inflicting damage usually caused, as has been repeatedly demonstrated, by a force of small dimensions travelling with high velocity, *e.g.*, a kick from a horse.

A diagnosis in this case was reached through an interpretation of no one symptom, but of the symptom-complex, which includes, briefly expressed, signs of shock, gas, fluid, inflammation in the peritoneal cavity, mainly, however, through the severe initial pain, which continued, and especially to muscular rigidity which also continued. This latter fact is important, as it is not infrequent to find cases, which have sustained abdominal blows exhibit a tenseness of the abdominal muscles shortly after injury, which, however, disappears within an hour or so. It has been our habit here to trust much to this sign in all cases where solution of continuity of the gut comes in question, and, though undoubtedly sometimes at fault, more

especially in cases of typhoid perforation, yet no sign deserves precedence. French surgeons have perhaps insisted on this more than those of other nationalities. Hartman reports 37 cases *contusio abdominis,* in 17 of which this sign was present, and in all these rupture was demonstrated. Peritonitis should be well started in six hours, and, except in cases where leakage is directly into the pelvis, much may be trusted to this sign. Vomiting is an invaluable adjunct, but too often long delayed.

This adds, I venture to hope, another grain to the scale of professional opinion in favor of early operation. Petry, in 1886, reported that of 160 cases of rupture into small bowel, 11 got well, 10 with abscess formation, and cases are recorded which have lived some time (three weeks) postoperative, and died from secondary perforation of abscess, but among surgeons to-day the question is but one of time when to operate. Shock is a serious drawback, no doubt; but much of its terrors are overcome by the use of ether anæthesia. Peritonitis and hæmorrhage are more serious items. A review of literature dealing with this subject affords us a striking instance of advance in abdominal surgery, and, in view of recent increase in reported recoveries, yields us, I trust, a not unwarrantable satisfaction of *erga facta pro bono humano.*

CASES OF RECOVERY SINCE 1894.

KNAGG. British Medical Journal, 1904, 832, 1 recovery.

MACDONALD. Albany Medical Annals, 1897, 1 recovery.

BUCHANAN. ANNALS OF SURGERY, 1900, 1 recovery.

LUND, NICHOLS, and BOTTOMLEY. Boston Medical and Surgical Journal, 1902, cxlvii, 584, 4 recoveries.

ELLIOT. ANNALS OF SURGERY, 1901, 34, 293, 1 recovery.

WIGGIN. New York Medical Journal, 1894, 1 recovery.

WALSHAM. Lancet, 1899, 1 recovery.

WATSON. American Journal Surgery and Gynæcology, St. Louis, 1897-8, 1 recovery.

SCUDDER. Boston Medical and Surgical Journal, 1 recovery.

CAHIER. Societe de Chir. de Paris, 1902, 1 recovery.

GUINARD. Revue de Chir., 1897, 3 recoveries.

REOBLANC. Ibid., 1897, 1 recovery.

Le Dentu. Ibid., 1897, 3 recoveries.

Societe de Chir. de Paris, 1899, 3 recoveries.

Kirslein. Deutsche Zeitschrift für Chirurgie, 1900, 8 recoveries (up to 1900).

Riegner. Deutsche Zeitschrift für Chirurgie, 1902, 1 recovery.

Thirty-two in all, to which undoubtedly there are uncollected cases to be added.

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